

**Preliminary Findings of the**

**NUTRITIONAL ASSESSMENT and**

**SENTINEL SURVEILLANCE SYSTEM**

**For West Bank and Gaza**

**5 August 2002**

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*Global Management Consulting Group*  
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## Introduction

Food security, the sustainable ability of a household to feed its members in sufficient quantity and quality to ensure healthy lives for each, is often compromised during periods of conflict. Throughout the last 20 years, humanitarian aid agencies and government donors have been challenged by the multiple causes of food insecurity world-wide. Massive food shortages, large-scale diarrheal epidemics, poverty, and natural disaster have all contributed to food insecurity and subsequent malnutrition, anemia, and micronutrient deficiencies. Since the onset of the second *intifada* in the West Bank and Gaza Strip (WBGs) that began in September 2000, no reliable, systematic assessment of food security and humanitarian indicators has been done.

CARE West Bank/Gaza and other international and Palestinian NGOs received anecdotal evidence that the Palestinian economy and health infrastructure were being challenged from the conflict, and that health, in particular, nutritional problems, were emerging. The Palestinian Ministry of Health raised similar concerns. At the request of the USAID West Bank/Gaza Mission, researchers from the Johns Hopkins University School of Public Health, under a sub-contractual relationship with CARE International's Emergency Medical Assistance Program, designed a three component **nutritional assessment** to assess the causes of malnutrition and anemia and comprehensively pinpoint areas for strategic programmatic interventions. Furthermore, in light of the curfews, road closures, and restrictions placed on the movement of the Palestinian population, a household **sentinel surveillance system** was initiated to measure humanitarian health indicators including food security, a compliment to data from the Nutritional Assessment.

The nutritional assessment consists of a **household survey** to directly measure levels of acute and chronic malnutrition and anemia and evaluate food consumption; a **market survey** to determine the market's capacity to function; and a **clinic survey** to evaluate the health provider's capacity to recognize and treat malnutrition and anemia. This report will provide the *preliminary* findings of the completed household and market surveys. The clinic survey will finish in late-August. A final comprehensive report will be made available at the conclusion of all three components in early September.

### *Features of USAID/CARE/Johns Hopkins/Al Quds Assessments in West Bank/Gaza:*

#### **Nutritional Assessment**

- One-time
- All West Bank and Gaza
- Comprehensive: 3 components
- Household Survey
  - Nutritional Status of Women, ages 15-49 years
  - Children, ages 6-59 months
  - Nutritional Status
  - Food Consumption
- Market Survey
  - Retailers and Wholesalers
  - Food Supply Disruptions and Causes
  - Price Fluctuations
- Clinic Survey
  - Clinics linked to households
  - Capacity to recognize and treat malnutrition, anemia

#### **Sentinel Surveillance System**

- Ongoing
- All West Bank and Gaza
- Indicators:
  - Food availability and affordability
  - Water quality and quantity
  - Sentinel infectious diseases
  - Primary and specialized health care access

A description of both assessments is provided in the inset box and in their respective sections of this report.

### **Nutritional Assessment: Household Survey**

Through a competitive tendering process, Al Quds University was chosen to partner with Johns Hopkins University on the design of the household final questionnaire and sampling frame, and to fully implement the field study and data analysis of the household survey. Al Quds was a well-qualified partner given their strong history of public health research, especially in the field of nutrition within the Palestinian population, and the depth of field experience of their data collectors. All data collectors have medical and/or public health Bachelor or Masters degrees with previous experience in anthropometric measurements and obtaining blood samples. A West Bank/Gaza-wide food consumption survey, unique for its design, completed by Al Quds' Dean of Research, Dr. Ziad Abdeen, in 1999, provided a basis for energy, protein, and micronutrient comparisons.

Traditionally, women and children have been the most vulnerable groups of the population during periods of food insecurity. The household survey targeted children ages 6-59 months and reproductive age women ages 15-49 years in 1000 households throughout WBGS. Presented in this preliminary report are the complete malnutrition and anemia data of 936 children and 1,534 non-pregnant and pregnant reproductive age women. Twenty-four hour protein, calorie, and micronutrient intake will be available in the final report.

### **Methodology**

- A three stage stratified random sampling of 1000 households based on Palestinian Central Bureau of Statistics 1997 census maps (most recent).
- Capillary blood samples were obtained using the Hemocue photometer (Hemocue AB, Angelholm, Sweden), an instrument field tested by USAID-funded demographic and health surveys worldwide. Each photometer is calibrated at the start of the assessment and controls checked at the beginning of each data collection day.
- Gauged mats with head and foot braces were used for infant length measurements to minimize systematic error.
- The internationally field tested Tanita Baby/Adult Digital Scale 1582, graduated to 20kg for infants and 100 kg for adults, was used for weight measurements.
- Quality assurance was maintained by field supervisors who independently cross-checked households with repeat visits to ensure accuracy and to minimize bias.

### **Results**

A nutritional disorder or condition resulting from faulty or inadequate nutrition defines **malnutrition**. **Acute malnutrition or wasting** reflects inadequate nutrition in the short-term period immediately preceding the survey. The ratio of a child's weight to height (or in the case of an infant, weight for length) is the commonly used and most accurate indicator of wasting. **Chronic malnutrition, or stunting**, is an indicator of past growth failure, thus implying a state of longer term (weeks to months to years) undernutrition. Chronic malnutrition may lead to

serious growth and development delays. The ratio of a child's height for age is the most useful indicator for chronic malnutrition. WHO has classified the severity of acute and chronic malnutrition based on standard deviations (SD) below the median of the population studied. The **measure of greatest interest** (and the one most commonly referred to by donor and humanitarian agencies) is that segment of the population below 2 SD, classified as **moderate (between 2 and 3 SD) and severe (below 3 SD) combined**. Table 1 below reflects the distribution of wasting and stunting in the population of Palestinian children ages 6-59 months. Underweight, or weight for age, is not as useful an indicator as wasting or stunting. Highlighted is the **cumulative percent**, the total percentage of children considered both moderately and severely malnourished.

**Table 1: Anthropometric measurements for children ages 6-59 months by region**

Growth data	Area					
	West Bank		Gaza Strip		WBGS	
	N	Cumulative %	N	Cumulative %	N	Cumulative %
<b>Wasting</b>						
< -3 SD/ Severe	1	0.2	20	3.8	21	2.2
>= - 3 and < -2 SD/ Moderate	17	4.3	49	13.2	66	9.3
>= -2 and < -1 SD/ Mild	49	11.8	72	27.0	121	22.2
>= -1 SD/ Normal	349	100.0	379	100.0	728	100.0
Total	416		520		936	
<b>Stunting</b>						
< -3 SD/ Severe	12	1.3	41	7.9	53	5.7
>= - 3 and < -2 SD/ Moderate	21	3.5	50	17.5	71	13.2
>= -2 and < -1 SD/ Mild	75	21.5	103	37.3	178	32.3
>= -1 SD/ Normal	308	100.0	326	100.0	634	100.0
Total	416		520		936	
<b>Under Weight</b>						
< -3 SD/ Severe	3	0.7	14	2.7	17	1.8
>= - 3 and < -2 SD/ Moderate	13	3.8	48	11.9	61	8.3
>= -2 and < -1 SD/ Mild	73	21.4	99	30.9	172	26.7
>= -1 SD/ Normal	327	100.0	359	100.0	686	100.0
Total	416		520		936	

A moderate and severe acute malnutrition rate of 9.3% (total WBGS) is **considered an emergency by most humanitarians and public health officials**, and most definitely is in the Gaza Strip where the rates are over three times that of the West Bank (13.2% and 4.3% respectively). By contrast, in a normally nourished population, only 2.28% of the children would be below 2 SD. A significant proportion of children are chronically malnourished (moderate and severe combined 13.2% for WBGS) with rates in Gaza five times those of the

West Bank (17.5% and 3.5% respectively). Poverty, by all economic indicators more significant in the Gaza Strip than the West Bank, would likely explain some of the disparity.

Non-urban areas show higher rates of acute malnutrition than urban (Table 2) although chronic malnutrition is slightly more prevalent in urban areas. This suggests that non-urban areas, traditionally the food-producing area of WBGS, are now facing significant food security problems.

**Table 2: Anthropometric measurements for children ages 6-59 months by urban versus non-urban**

<b>Growth data</b>	<b>Urban</b>		<b>Non-urban</b>	
	<b>N</b>	<b>Cumulative %</b>	<b>N</b>	<b>Cumulative %</b>
<b>Wasting</b>				
< -3 SD/ Severe	14	2.2	7	2.2
>= - 3 and < -2 SD/ Moderate	35	7.8	31	12.1
>= -2 and < -1 SD/ Mild	80	20.6	41	25.2
>= -1 SD/ Normal	495	100.0	233	100.0
Total	624		312	
<b>Stunting</b>				
< -3 SD/ Severe	39	6.3	14	4.5
>= - 3 and < -2 SD/ Moderate	50	14.3	21	11.2
>= -2 and < -1 SD/ Mild	125	34.3	53	28.2
>= -1 SD/ Normal	410	100.0	224	100.0
Total	624		312	
<b>Under Weight</b>				
< -3 SD/ Severe	13	2.1	4	1.3
>= - 3 and < -2 SD/ Moderate	39	8.4	22	8.4
>= -2 and < -1 SD/ Mild	99	19.0	73	31.8
>= -1 SD/ Normal	473	100.0	213	100.0
Total	624		312	

**Anemia** reflects a decrease in the oxygen carrying capacity of the blood due to a decrease in the mass of red blood cells. Hemoglobin, the oxygen carrying protein of red blood cells is the most useful indicator of anemia. Iron, folic acid, and dietary protein are necessary for hemoglobin and red blood cell production. Iron deficiency in particular is the leading cause of anemia worldwide. Thus malnutrition or inadequate nutrition can lead to anemia and subsequent impaired learning and growth development (children), low birth weight infants and premature delivery (maternal anemia), fatigue and diminished physical and mental productivity (adults) and decreased immunity from infectious diseases (all ages).

WHO classifies the severity of anemia by hemoglobin levels in gm/dl of blood. As in malnutrition, the widely accepted combined categories of moderate and severe are most commonly used as an indicator. Tables 3 and 4 reflect anemia rates for children ages 6-59 months. Highlighted in the following tables are the cumulative percentages of the population with moderate and severe anemia.

**Table 3: Hemoglobin values of children, ages 6-59 months by region**

Hemoglobin level (WHO Classification)	Area					
	West Bank		Gaza Strip		WBGS	
	N	Cumulative %	N	Cumulative %	N	Cumulative %
<7 (Severe)	2	0.5	1	0.2	3	0.3
7 - 9.9 (Moderate )	85	20.9	97	18.9	182	19.7
10 - 11.9 (Mild)	95	43.7	131	44.1	226	43.8
> 11.9 (Normal)	234	100.0	291	100.0	525	100.0
Total	416		520		936	

**Table 4: Hemoglobin values of children ages 6-59 months by urban versus non-urban**

Hemoglobin level (WHO Classification)	Area			
	Urban		Non-urban	
	N	Cumulative %	N	Cumulative %
<7 (Severe)	2	0.3	1	0.3
7 - 9.9 (Moderate )	129	21.0	53	17.3
10 - 11.9 (Mild)	154	45.7	72	40.4
> 11.9 (Normal)	339	100.0	186	100.0
Total	624		312	

Nearly one-fifth of Palestinian children ages 6-59 months are moderately and/or severely anemic with little difference between West Bank and Gaza Strip populations. The urban population of this age group shows a tendency for increased anemia compared to non-urban but a definitive statement cannot be made until tests of significance can be done. Table 5 illustrates hemoglobin levels for non-pregnant women ages 15-49. Pregnant women must be analyzed separately as pregnancy itself causes a “relative” anemia—an increased blood volume for a similar mass of red blood cells. Women in Gaza show a tendency toward greater prevalence for anemia than the West Bank, but again, significance testing is needed to make that determination. There was no meaningful difference between urban and non-urban populations.

**Table 5: Hemoglobin values of non-pregnant women ages 15-49 years by region**

Hemoglobin level (WHO Classification)	Area					
	West Bank		Gaza Strip		WBGS	
	N	Cumulative %	N	Cumulative %	N	Cumulative %
<7 (Severe)	1	0.1	3	0.4	4	0.3
7 - 9.9 (Moderate )	69	9.5	93	12.0	162	10.8
10 - 11.9 (Mild)	251	43.8	328	52.8	579	48.6
> 11.9 (Normal)	410	100.0	379	100.0	789	100.0
Total	731		803		1534	

Anemia interventions usually involve some form of iron supplementation. As other micronutrients such as folate can also cause anemia, the detailed food consumption analysis segment of the household survey will be a useful guide for meaningful interventions. The food consumption data will be finalized by late August and made available in the final report.

### **Nutritional Assessment: Market Survey**

While the household component of the nutritional assessment describes the capacity of families to provide food for themselves, the market component assesses the capacity of the market to supply that food. Through a competitive tendering process, Global Management Consulting Group was chosen to finalize a questionnaire in collaboration with Johns Hopkins University, formulate a sampling frame, and implement the data collection and analysis. Global's experience in marketing and socioeconomic surveys with a variety of international, Palestinian, and Israeli agencies and firms confirmed their selection.

The purpose of the market survey is to:

- Evaluate whether staple foods of the Palestinian diet were available in the marketplace over the previous one month. Staple foods are defined as non-luxury items that contribute to the nutritional intake of the population.
- Identify significant disruptions in the marketplace. "Disruptions" or "major shortages" are defined as  $\geq 3$  days in which retailers and wholesalers regarded food products in a state of significant shortage (not available as usual or severely diminished in stock) and were unable to replenish them during that period.
- Follow price fluctuations (if they exist) over the last two years.

### Methodology:

- A two-stage stratified random cluster sample of 800 retailers and wholesalers throughout all of the West Bank and Gaza; strata include urban wholesale, urban retail, small village, large village, and refugee camps (Table 6) and by zones (North, Middle, and South zones of the West Bank, North Gaza/Gaza City and Middle/South zones in the Gaza Strip).
- The sample size is calculated assuming an expected precision of at least 95%, allowable risk of 5%, and design effect equal to 0.5.
- Staple foods categories include: fresh/frozen meats, poultry, dairy, fruits and vegetables, bread/grain, and canned/bottled foods (See Annex 1 for specific foods within each group).
- Disruptions (periods of major shortages as defined above) were categorized by reason:
  - Israeli military incursions and curfews
  - Israeli military enforced road closures and checkpoints
  - Israeli military enforced border closures
  - Unavailability at the Israeli importer
  - Import delay/stoppage unrelated to Israeli closures
  - End of season for food item
  - Decreased production capacity
  - Decreased supply diversification
  - Other

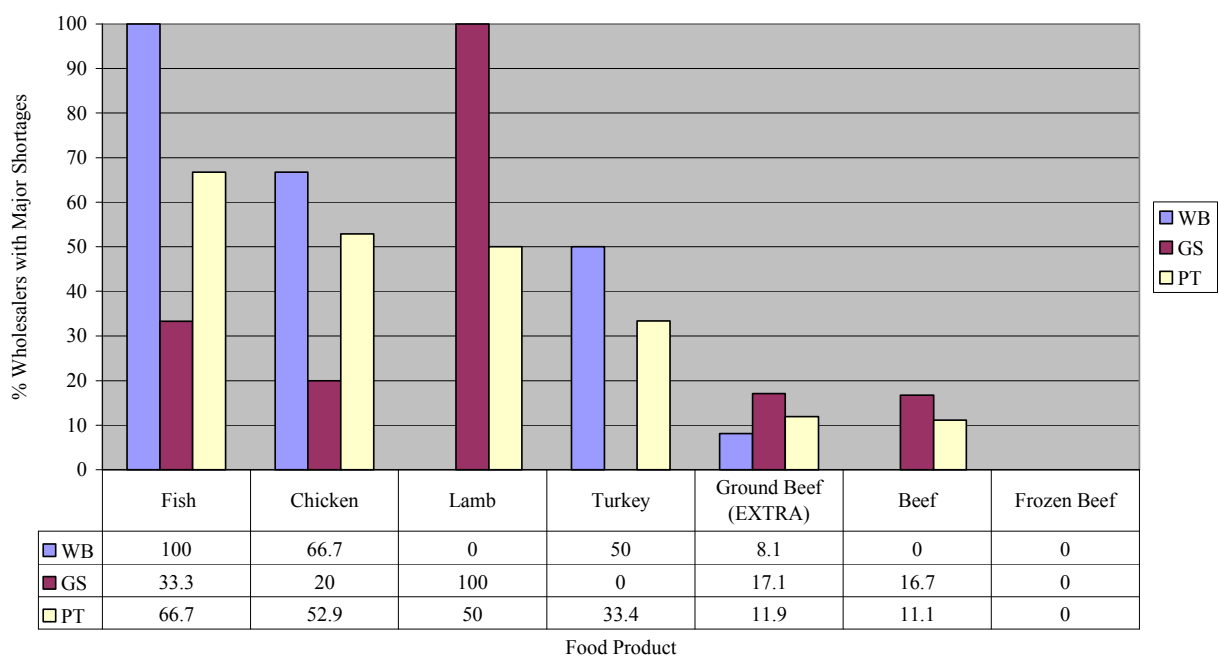
***Table 6: Market survey, sample size by stratum***

<b>Strata</b>	<b>No. of Establishments in the West Bank</b>	<b>No. of Establishments in Gaza Strip</b>
Urban wholesale food establishments	80	40
Urban retail sale food establishments	283	183
Large village & refugee camp establishments	97	63
Small village establishments	40	14
<b>Total</b>	<b>500</b>	<b>300</b>

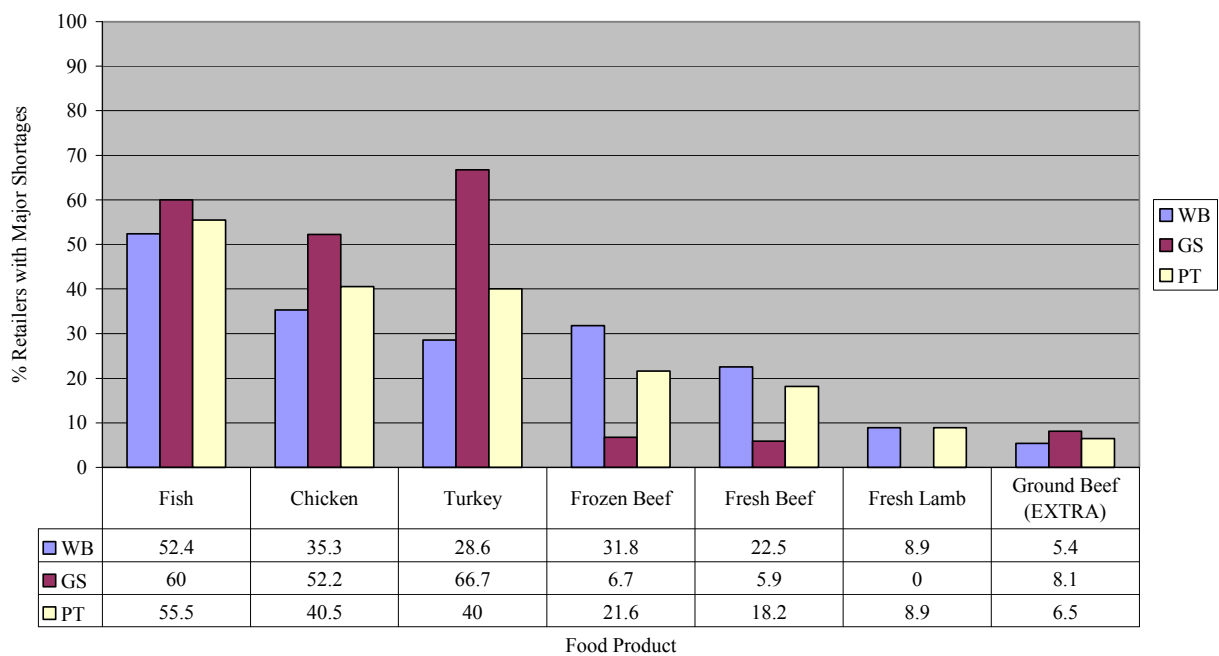
### Results

Data collected reflects events in the market during June 2002, a period during which there were prolonged days of 24 hour curfews for urban West Bank areas and border closures for Gaza. The following four graphs depict high protein food groups—meat, poultry, and dairy products—with significant marketplace disruptions for wholesalers and retailers.

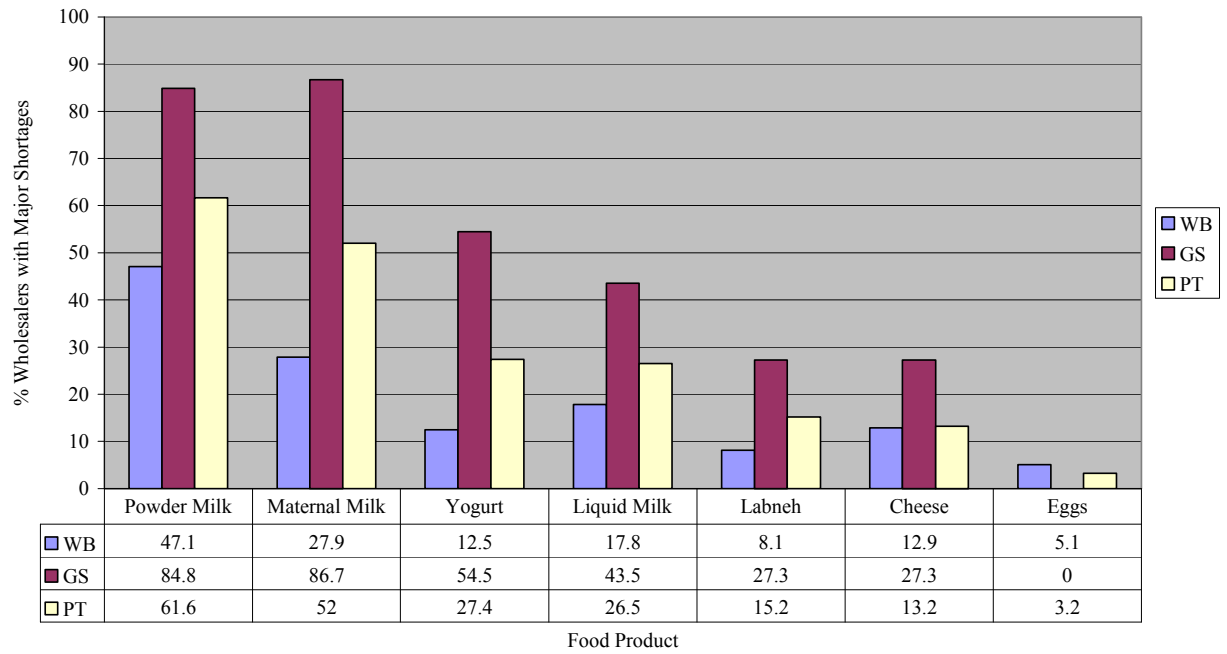
**Major Shortages of Meat and Poultry at Wholesalers**



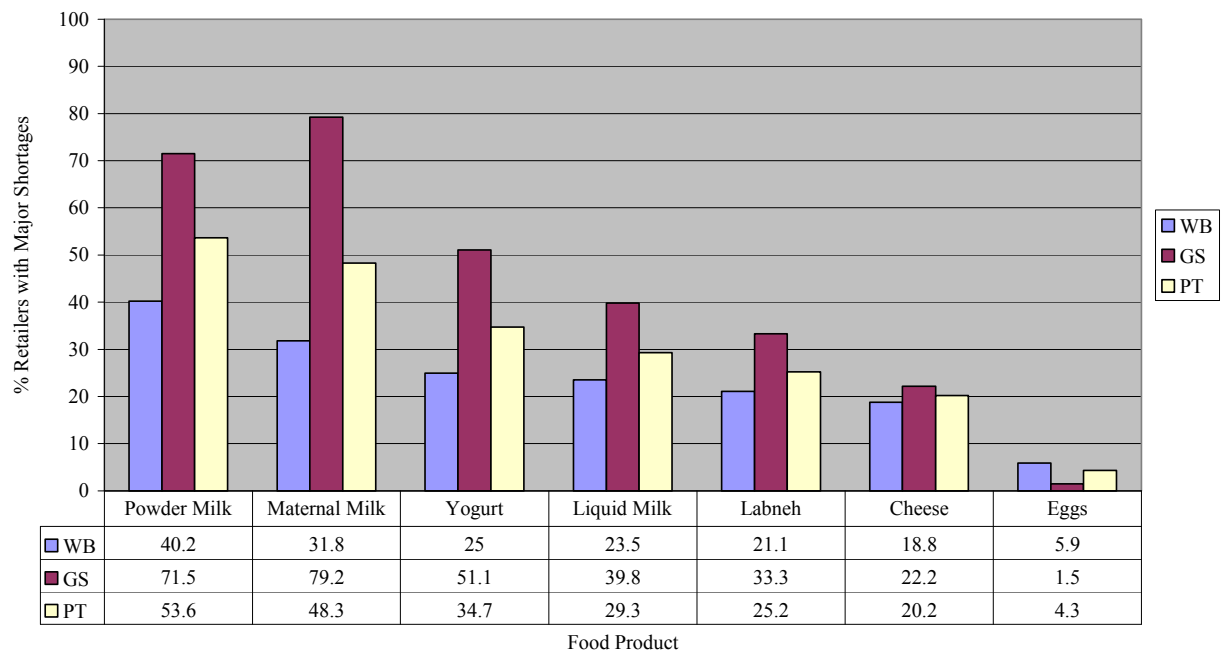
**Major Shortages of Meat and Poultry at Retailers**



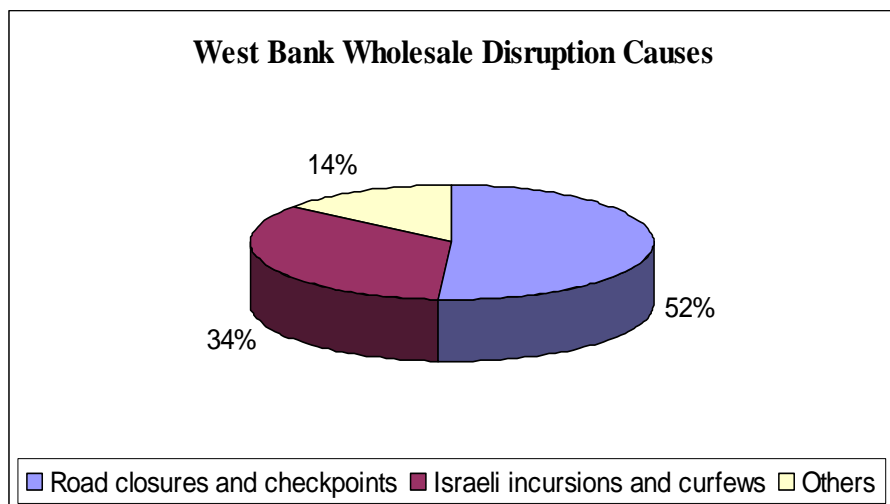
**Major Shortages of Dairy Products at Wholesalers**



**Major Shortages of Dairy Products at Retailers**



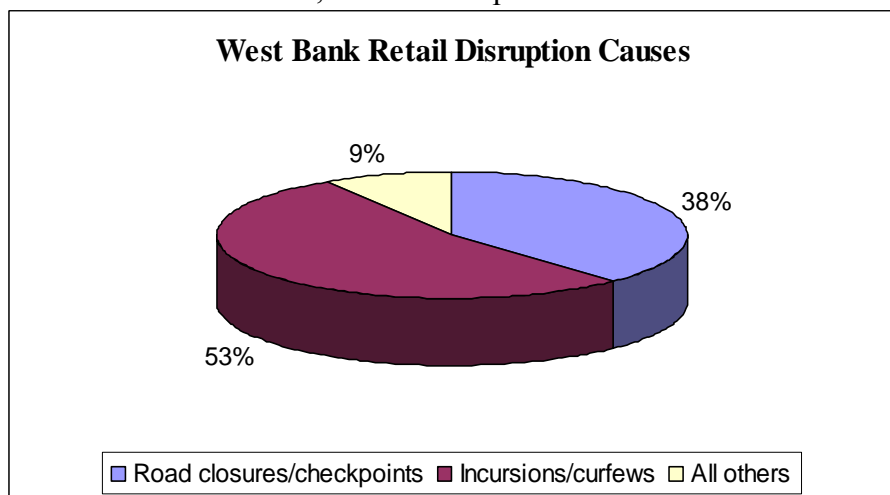
Wholesalers and retailers experienced significant shortages of powdered milk and infant formula (maternal milk), more so in Gaza as compared to the West Bank. In general, these high protein food groups were in shorter supply than the canned foods, grains, fruits, and vegetables groups (Annex 2). Disruptions by urban, large village, and small village/refugee camp will be discussed in the final report in September.



Border closure defines those periods when even the limited conduits through which goods pass from Israel into the West Bank and Gaza, from Jordan into the West Bank, and from Egypt into Gaza, are completely sealed. Curfew defines a situation in which no civilians or civilian vehicles are allowed on the streets, often for

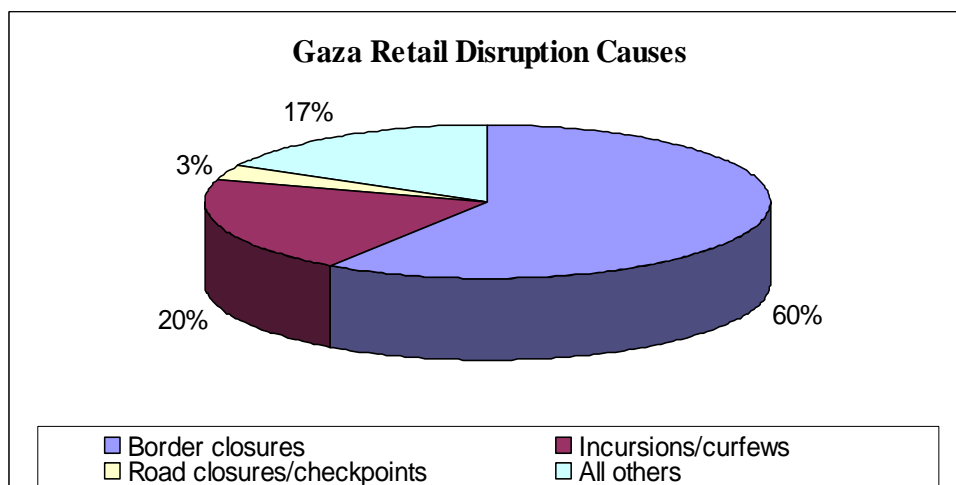
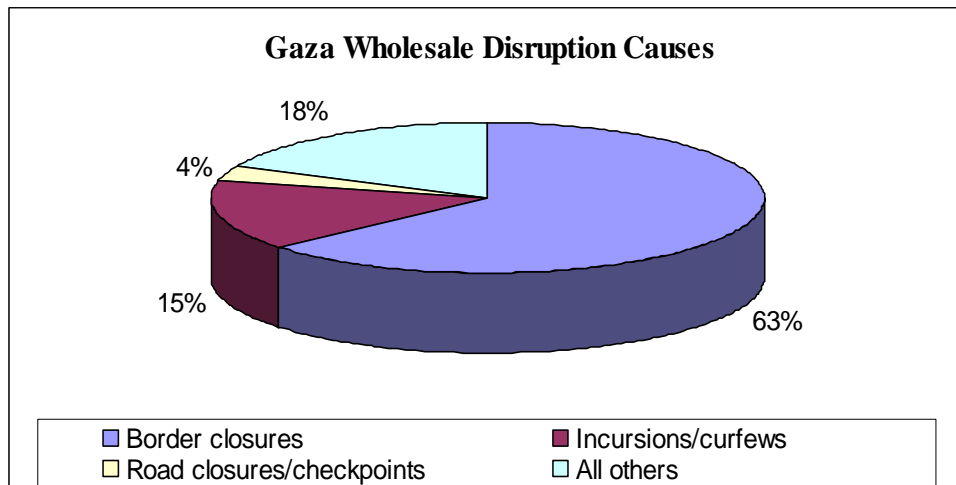
periods of 24 hours or more.

As might be expected, road closures and checkpoints created more market disruptions for West Bank wholesalers, while disruptions for retailers were more commonly the result of



incursions and curfews as goods could not travel under curfew conditions from wholesalers to retailers. By contrast, border closures are largely the cause of disruptions to Gaza wholesalers and retailers equally. The distribution for the causes of disruption were similar for all zones of the West Bank,

with incursions/curfew and road closures/checkpoints comprising roughly similar percentages for each zone. However, the Gaza North and Gaza City zone disruptions were far more often a result of border closures (76% of all causes) than Gaza Middle and South zones which involved closures/checkpoints (32.6% of all causes) nearly as much as border closures (44.5%).



The critical economic conditions continue to remain the commonly held main reason for food insecurity in WBGS. Nevertheless, clear evidence of market disruption, particularly for high protein foods, should be considered a contributing factor also.

### **Sentinel Surveillance System: Food Security**

The Sentinel Surveillance System (SSS) was designed by Johns Hopkins University in conjunction with the USAID Maram Project's Clinic Monitoring System to fill critical gaps in knowledge within the Palestinian health system. The purpose of sentinel surveillance and monitoring is to detect changes in trends and distributions of key public health indicators chosen to illuminate concerning flaws in the health system and provide guidance for intervention. Integrating data from household surveillance and health facility monitoring allows for comparison of the supply and demand for health services.

Through a competitive tendering process, Al Quds University was again chosen to implement the field questionnaire developed by Johns Hopkins University. The same Al Quds sampling frame, based on the Palestinian Central Bureau of Statistics (PCBS) census maps, was utilized and data collection and analysis was performed by Al Quds University. A network of Masters level public health students collected data which was first reviewed for accuracy by trained field supervisors and then by data analysts prior to data entry.

## Methodology

This research activity (separate from the one-time Nutritional Assessment) began 31 May, 2002 and is intended to collect and report on data related to the impact of the emergency on various aspects of the health sector every two weeks from June 2002 to September 2003. The Sentinel Surveillance System (SSS) is an ongoing survey which samples 20 households in urban and non-urban clusters every two weeks in all 16 districts of the West Bank and Gaza (320 households in each round). These households are not the same as those in the Nutritional Assessment. Questionnaires are reviewed a second time, prior to data entry. Findings presented here represent cumulative data from four rounds of collection (1280 households). Specific indicators include:

- Food availability
- Food consumption
- Food affordability
- Water availability, quality and quantity
- Water usage
- Sanitation
- Sentinel Infectious Disease
  - Diarrheal illness
  - Acute respiratory infections (children under 5)
  - Measles
  - Meningitis
- Health Care Access (Primary and Specialized Services)
  - Immunizations
  - Diabetes Management
  - Hemodialysis
  - Chemotherapy
  - Emergency Services

Indicators from the SSS are linked to the Maram Project's Clinic Monitoring which surveys health facilities in the geographic areas of the surveyed households. Clinic Monitoring indicators include:

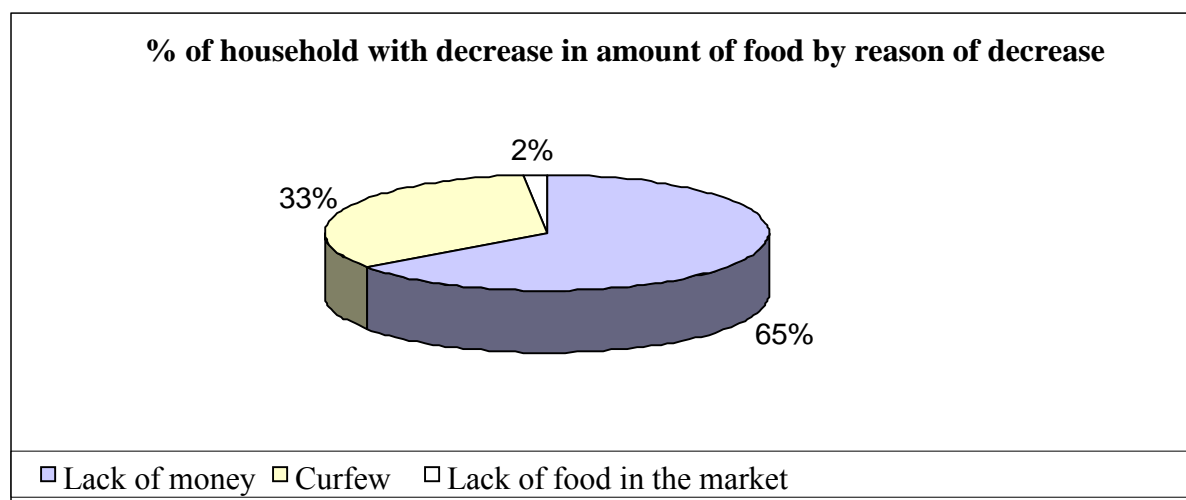
- Staff Access
- Facility Infrastructure (equipment, water and electricity)
- Sentinel Infectious Diseases (as above in SSS)
- Disruption of Clinic Services (all types)

Findings from the SSS presented in this report will only include those food-related indicators relevant to the Nutritional Assessment. Interval data from the ongoing SSS and Clinic Monitoring will be available on the websites of CARE ([www.care.org](http://www.care.org) and [www.carewb.org](http://www.carewb.org)) and WHO/HART ([www.hart.itcoop-jer.org](http://www.hart.itcoop-jer.org)) and updated every two weeks.

## Results

A total of 724 of the 1280 households sampled in the SSS (56.6 %) throughout all districts of WBGS reported that the amount of food eaten by household members had decreased for more than one day during the previous two weeks, a percentage that has remained consistent throughout all four rounds of sampling. The dire state of the Palestinian economy plays a greater role in the decrease of food consumption than curfew and closures or food availability in the market as noted in the graph below. Of the 724 households with a decrease in food consumption for more than one day, two-thirds cited lack of money and one-third cited curfews/closures as the reasons. Although the prices for basic food supplies have not changed in the eight weeks of data collection, 469 of 1280 Palestinian families (36.6%) lack the purchasing power to consistently feed their families. This is supported by two other trends that have stayed constant over the last 8 weeks:

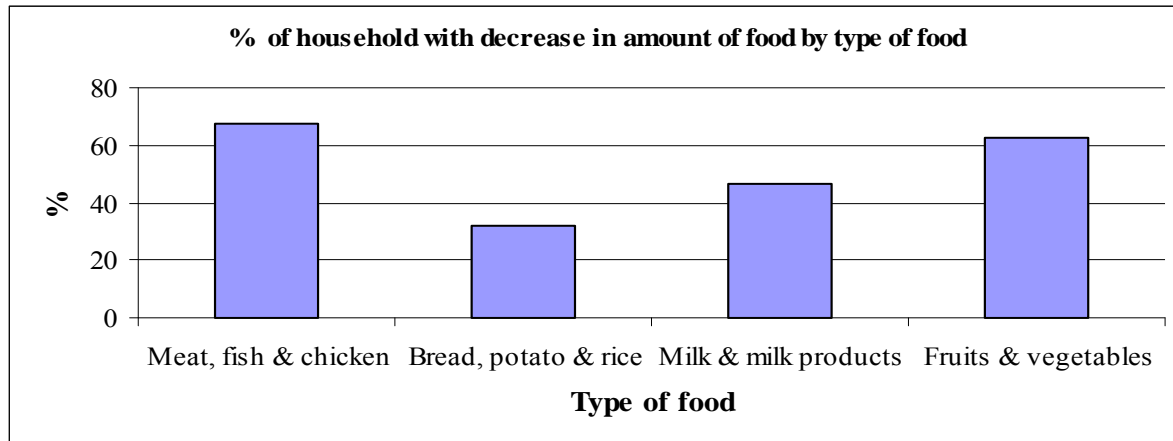
- 53.0% of 1280 households were forced to borrow money to purchase food during the two week sampling interval. Bethlehem (88.8 %), North Gaza (72.5%), Jericho and Gaza City (70 %) remain consistently high.
- 16.9% were forced to sell assets to buy food (the survey did not ask for types of assets). Gaza City (41.3 %) and Khan Younis (32.5%) were the highest for families in this category.



n = 724 households.

As might be expected, households are buying less higher priced food items such as meat, fish, and chicken, items which also have higher protein contents. The inability to purchase high protein foods is consistent with the diminished protein consumption data from the Nutritional Assessment above. Dietary protein is necessary for correcting anemia (red blood cell

production) and malnutrition (specifically protein-energy malnutrition). Perhaps surprisingly, 32.1 % of all households reported buying less bread, potatoes, and rice, basic, inexpensive staples of the Palestinian diet.



The SSS food indicator data highlights the economic difficulties of households to purchase foods despite the fact that market survey data show no sign of increasing prices for food items. They also suggest that, unlike retailers and wholesalers who are more directly affected by border closures, curfews and closures, household food security is more affected by the economy.

### **Conclusions: Humanitarian Considerations**

Certainly more information is needed to address the emergent problem of acute malnutrition, significant chronic malnutrition, and high levels of anemia in children. The finalizing of this comprehensive assessment with the clinic survey and food consumption analysis will make even clearer the more effective intervention strategies. Nonetheless, WBGS, and especially the Gaza Strip, face a distinct ***humanitarian emergency*** in regards to acute moderate and severe malnutrition, enhanced by these critical accompanying factors:

- Infants, young children, and reproductive age women require adequate protein in their diets to prevent anemia and protein-energy malnutrition.
- Market disruptions from curfews, closures, military incursions, border closures, and checkpoints affected key high protein foods, especially meat and poultry and dairy products, ***and in particular, infant formula and powdered milk.***
- Although not reported here, from preliminary findings of the food consumption data, reproductive age women and children under 5 demonstrate, ***based on half the household respondents,*** decreased protein and caloric intake in the presence of concerning levels of acute malnutrition and anemia.
- A significant portion of the population cannot afford high protein foods and nearly a third have difficulty affording basic inexpensive staples such as bread and rice.

- Poverty continues to cause food insecurity. Households are stressed financially as evidenced by the need to borrow money and sell assets for food. The same coping mechanisms were evident over one year ago. Eventually lending sources and assets will run dry.

Today's acute malnutrition (an easily reversible state) will be tomorrow's chronic malnutrition (less easily reversible), adding to already unacceptably high rates of chronic malnutrition, unless a variety of interventions—economic, political, and health-related—take place.

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## **Annex 1: Market Survey: Non-luxury Food Items Surveyed**

### Meats

Beef (fresh and frozen)  
Lamb (fresh and frozen)  
Fish

### Dairy

Liquid Milk  
Powder Milk  
Infant Formula  
Yogurt  
Labneh  
White cheese  
Eggs

### Grains

Flour  
Rice  
Sugar  
Salt  
Chickpeas  
Lentil  
Beans  
Fava Beans (foul)  
Macaroni  
Bulgar

### Canned Foods

Sardines  
Tuna  
Hummus  
Ready Hummus  
Beans  
Tomato Paste  
Cooking Oil  
Tehina  
Processed Meat, Turkey  
Mortadella

### Poultry

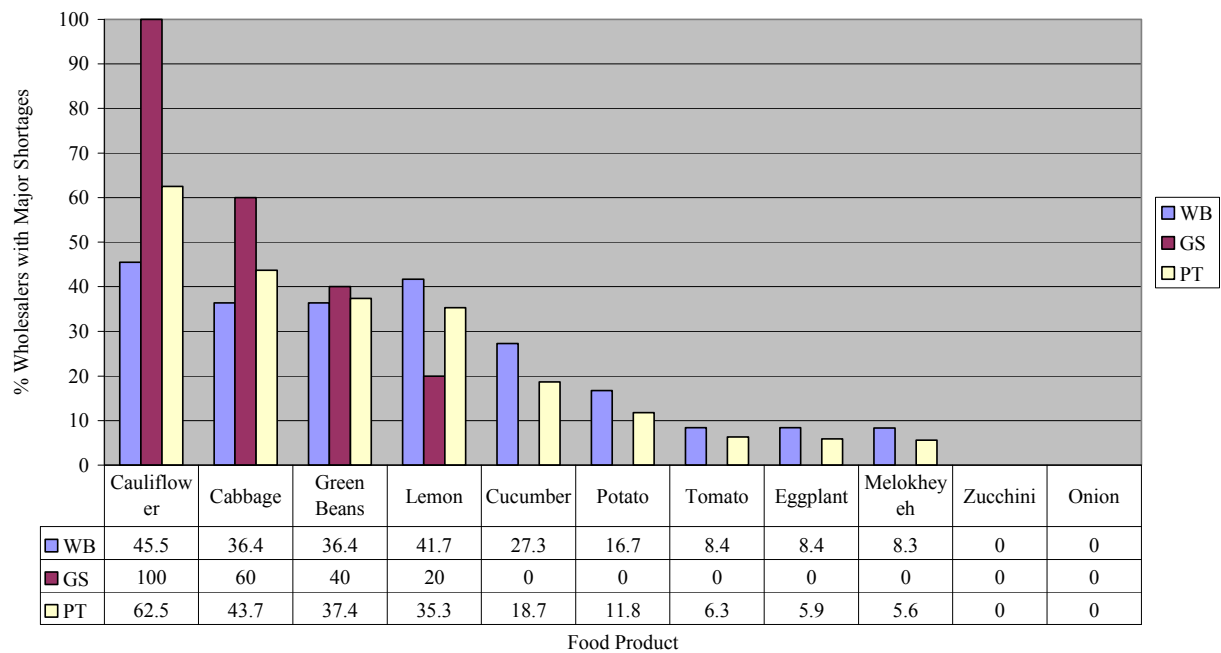
Turkey (fresh and frozen)  
Chicken

### Fruits and Vegetables

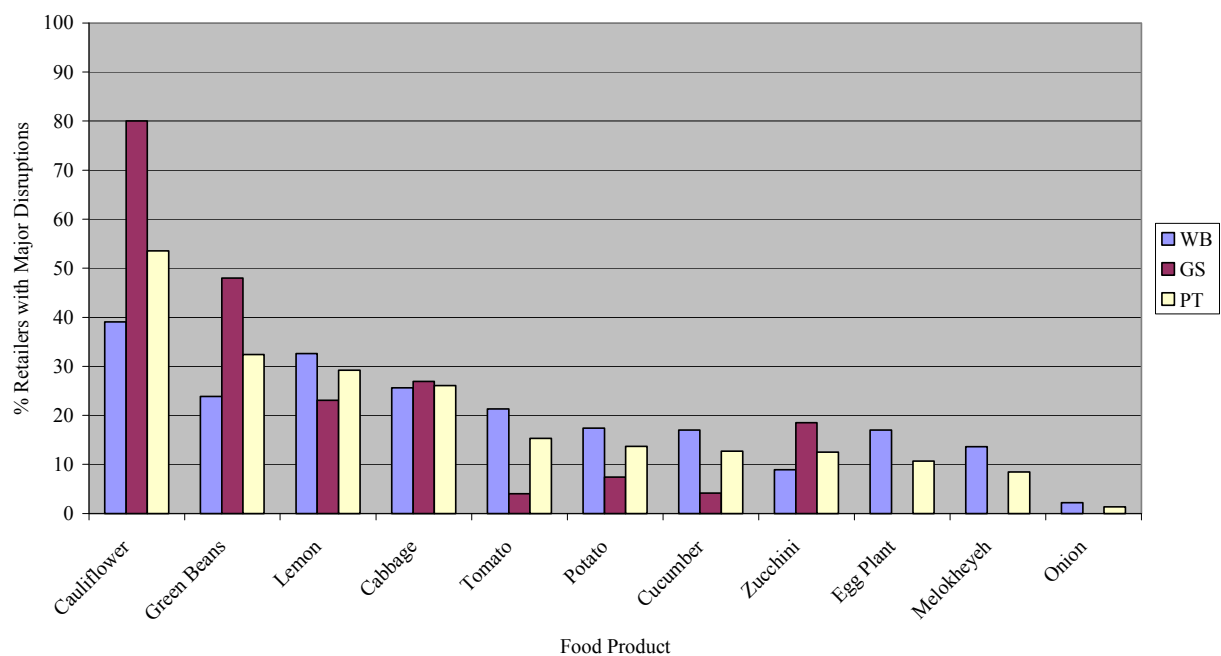
Tomato  
Potato  
Cucumber  
Eggplant  
Cauliflower  
Zucchini  
Lemon  
Orange  
Watermelon  
Banana  
Apples  
Grapes  
Melokhelieh  
Onion  
Cabbage  
Green Beans

## Annex 2: Market Survey, Disruptions

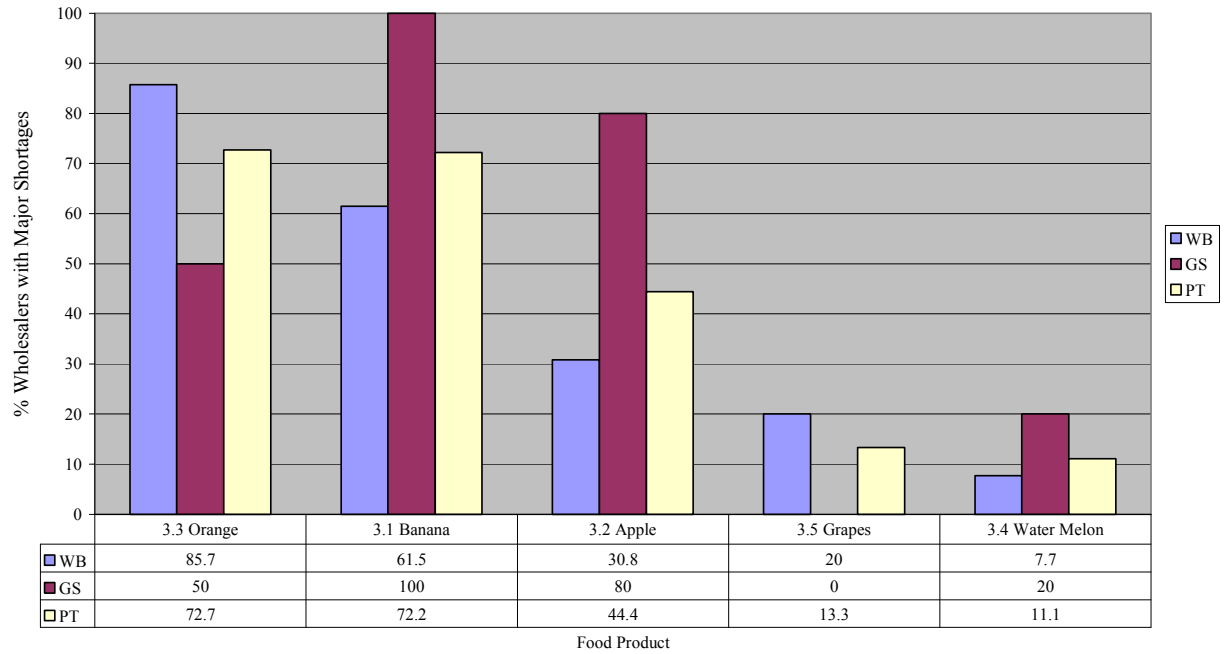
Major Shortages of Vegetables at Wholesalers



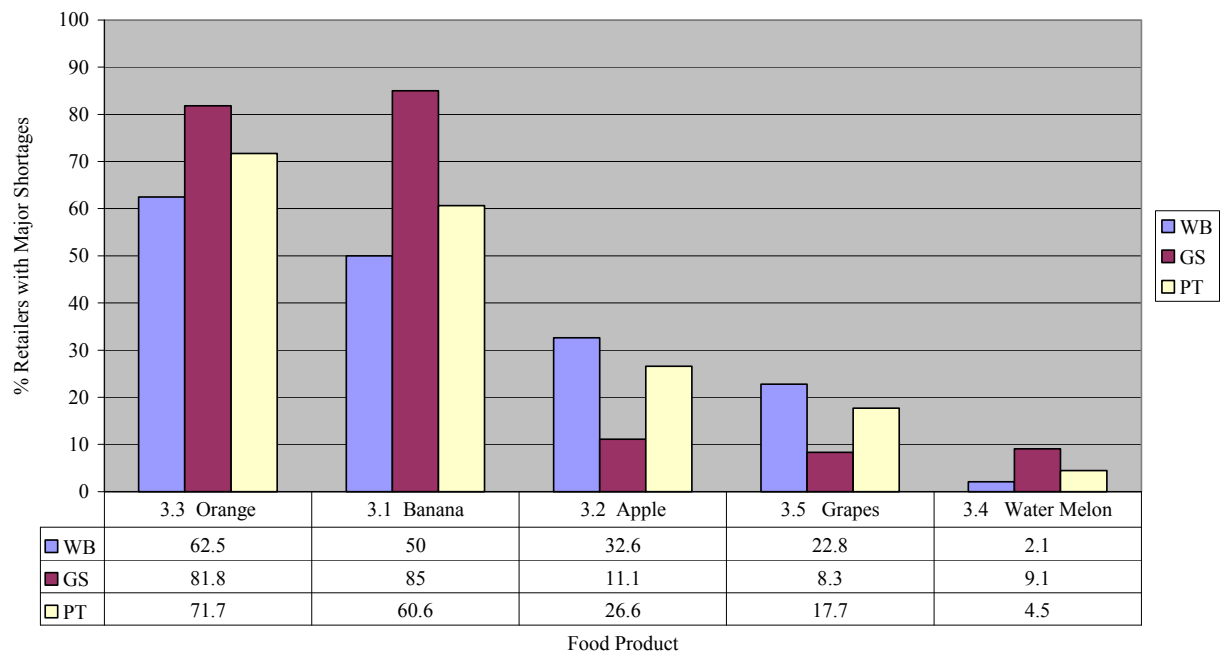
Major Shortages of Vegetables at Retailers



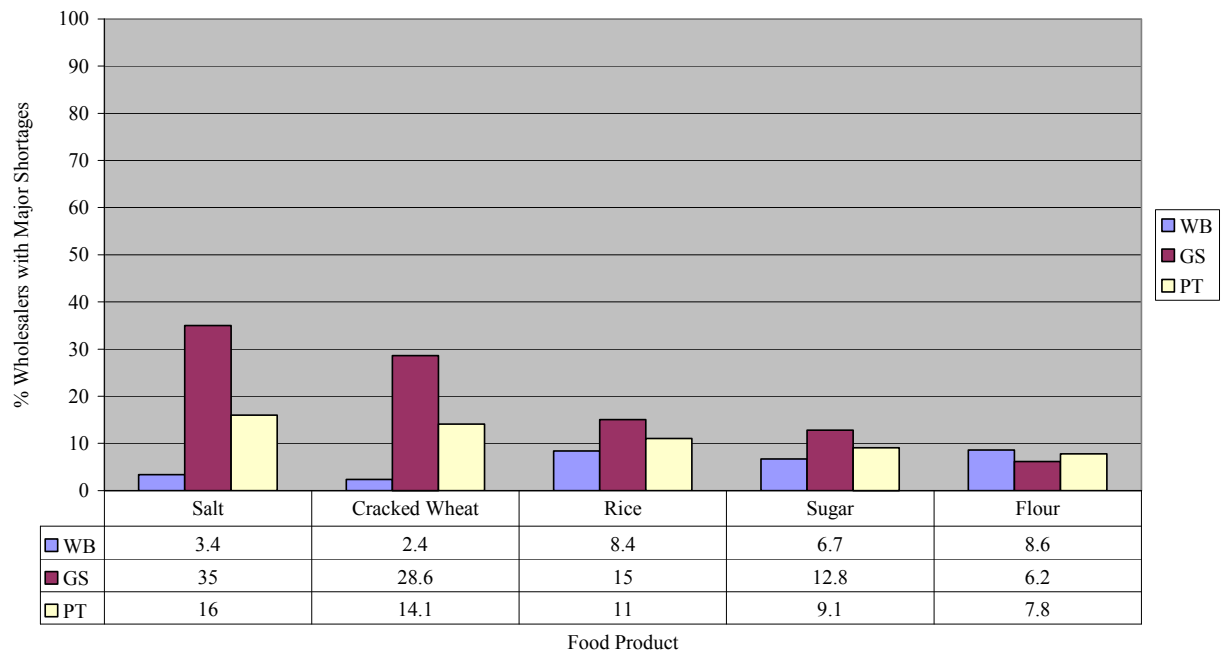
**Major Shortages of Fruit at Wholesalers**



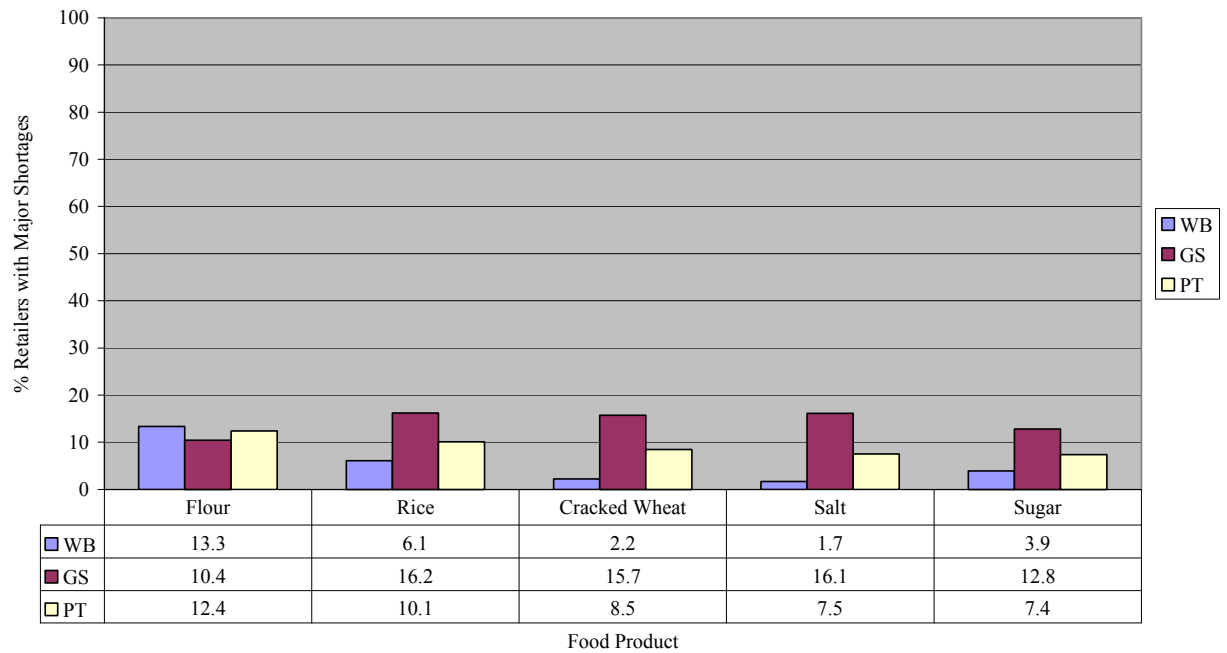
**Major Shortages of Fruit at Retailers**



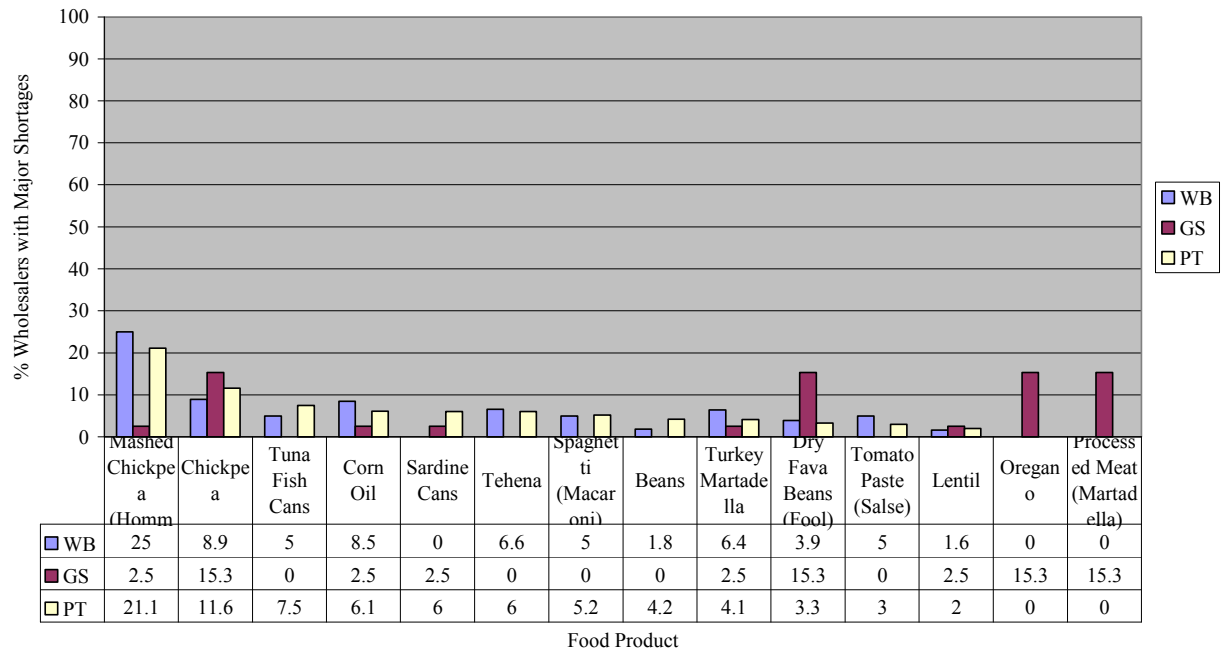
**Major Shortages of Cereals at Wholesalers**



**Major Shortages of Cereals at Retailers**



### Major Shortages of Canned Food at Wholesalers



### Major Shortages of Canned Food at Retailers

